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ABSTRACT

This paper outlines the use of confirmatory factor analytic techniques to assess the reliability of television program checklists as indicators of television exposure, to estimate the stability of television exposure over time, and to detect patterns of television content preference. A causal model incorporating these three properties was developed and tested using data collected from elementary school children at three weekly intervals. Results from analyses of the data were interpreted as indicating that the model is a plausible representation of the data. Program checklists were moderately reliable, and television exposure, moderately stable. Preferences for specific types of content including Saturday morning shows, action/adventure shows, and family-situation comedy shows emerge. Uses of confirmatory factor analysis to test other models are discussed. (Author/AA)

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Using Confirmatory Factor Analysis To Discern Patterns in Children's Television Viewing

by

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Abstract

This paper outlines the use of confirmatory factor analytic techniques to: 1) assess the reliability of television program check lists as indicators of television exposure, 2) estimate the stability of television exposure over time, and 3) detect patterns of television content preference. A causal model incorporating the above three properties is developed and tested using data collected from elementary school children at three weekly intervals. Analysis of the data reveals that the model is a plausible representation of the data. Program check lists are shown to be moderately reliable, and television exposure, moderately stable. Preferences for specific types of content including Saturday morning shows, action-adventure shows, and family-situation comedy shows emerge. Uses of confirmatory factor analysis to test other models are discussed.

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Testing propositions linking children's behaviors and attitudes to broadcast television requires quantification of television exposure. However, numerous problems arise for researchers examining patterns in children's television content preferences. Television programs are often watched not because they are liked but because they are the least offensive offering at a convenient viewing time or because they happen to precede or follow a popular show. On the other hand, some programs that might be enjoyed are not watched because more attractive alternatives are available.

Traditional psychometric methods designed for assessing measurement of cognitive variables such as attitude and ability are generally inappropriate for assessing television viewing behavior. These methods require strong empirical assumptions that are implausible with reference to behavioral data. The reasons for such implausibility are discussed below. New methods based on path analytic or causal modeling procedures make less demanding assumptions. This paper delineates how causal modeling may be used to address both measurement and substantive issues involved with television exposure. Specifically, interest is focused on: (1) reliability of a show check list procedure for measuring television exposure, (2) stability of television viewing over time, and (3) discerning patterns of preference for television content types. An empirical example based on television exposure data gathered from elementary school children at three weekly intervals is provided.

Reliability--the detection of systematic differences across observations--is the most rudimentary requirement of any useful measurement procedure. Measurement theorists generally assume that observed variance is caused by an unobserved factor (true score) and random error. Reliability is defined as the portion of observed variance accounted for by the underlying true score. The most common reliability estimation procedures (e.g., Cronbach's Alpha) make use of multiple measures of a single variable administered on a single occasion. Such procedures require strong assumptions concerning parallelism among items. While it is not difficult to conceive of multiple parallel items to tap cognitive variables like mathematical ability, this is not true of behavioral variables like television viewing. There is a very limited number of ways to ask: "how much television do you watch?", and even if multiple items could be devised they would be very unlikely to meet the assumptions of parallelism, i.e., equal means, variances, and relations to true television exposure. It is relatively easy to generate a list of television programs and to ask respondents how often they watch those programs; however, the procedure would hardly be expected to yield parallel items. For one thing, watching any particular program would necessarily preclude viewing other programs in the same time slot. Thus, the two programs would intercorrelate negatively although each is an equally good indicator of television viewing.

The second common method of reliability estimation--the test-retest procedure--requires only that a single measure be administered at two or more points in time. While this makes the assumption of parallelism more plausible (it is reasonable to assume that a single measurement item has

consistent properties across time), two major problems arise: (1) respondents may become sensitized to the measurement instruments, and (2) use of the procedure requires an assumption of stability of the phenomenon under consideration over time. The sensitization problem is probably minor since respondents could hardly be expected to strive to improve their television viewing level over time. However, instability is a major problem; over short periods like a week minor perturbations in weather and family schedules would be expected to change viewing level; over longer period changes in taste and life style would have effects. Thus, the test-retest procedure is not an appropriate technique for assessing the reliability of television viewing because the assumption of stability can not be met.

Assessment of the stability of television exposure is of substantive interest. Researchers generally agree that regular exposure to consistent content is a necessary condition for the medium to have social effects (cf. Greenberg, 1975). Given multiple parallel measures of television viewing at two or more points in time researchers could estimate both the reliability and stability of television exposure. Alpha coefficients could be computed and the resulting reliability estimates could be used to correct the observed time-one-time two correlations for attennation yielding stability estimates. Also, path analytic procedures have been devised for simultaneous estimation of stabilities and reliabilities given single measures at three or more points in time (Heise, 1969; Wiley & Wiley, 1970).

In addition to reliability of measurement procedures and stability of

general television exposure, researchers should be concerned with assessment of exposure to subcomponents of television content. Past research has progressed by isolating general themes of television content and by documenting that heavy exposure to television is associated with specific attitudes and behaviors. This is generally true of survey research linking exposure to television violence to aggression (for a review, see Chaffee, 1972) and studies showing an association between television exposure and acceptance of traditional sex-role stereotypes (Beuf, 1974; Freuh & McGhee, 1975). However, researchers have shown that consistent exposure to specific programs that deviate from the television norm have effects in the opposite direction of overall television exposure. Stein & Friedrich (1972) found that exposure to "prosocial" television content promoted kindly and helpful acts among preschoolers. Miller and Reeves (1976) found that consistent exposure to programs featuring women in counter-stereotypic occupations increased third through sixth-graders' acceptance of girls aspiring to those occupations.

Television content is less consistent than it was a few years ago. The growth of public television, the advent of "family hour," and the insertion of "prosocial" content into the Saturday morning schedule have greatly diversified the television content available. This diversity of content allows for a great variety of viewing patterns and greatly complicates investigation of television effects. For example, some children may learn aggression by watching violent programs; others may learn helpful behavior by watching "prosocial" programs. Children may learn both types of behavior, or the effects of viewing may cancel.

Separating these competing possibilities will require detailed attention to children's television program perferences and patterns of exposure. Traditional methods of discerning underlying factors (e.g., principal components factor analysis or cluster analysis) are based on arbitrary mathematical criteria and when children's program perferences are analyzed with them complex patterns emerge. These patterns reflect the influence of such variables as time of broadcast, proximity to other programs, network, and channel strength (Wakshlag & Korzenny, unpublished). What is needed is a method of testing models of television viewing based on variables of substantive interest and eliminating extraneous variables. Such procedures, called confirmatory factor analysis, have been devised and the appropriate computer software has been developed (Joreskog, 1969; Joreskog & van Thillo, 1971). Joreskog's procedures yield maximum likelyhood estimates of model parameters and a chi-square test is computed for checking the fit of the model to the data. This paper demonstrates how Joreskog's procedures may be used to simultaneously estimate reliability and stability parameters and to isolate hypothesized content preference patterns from data on children's television exposure.

The Data

The empirical example presented here makes use of data gathered from elementary school children in a small midwestern city. These data were gathered in conjunction with other research concerning television and language development (Milkovich, in preparation) and television and sex role learning (Miller, unpublished). They include measures of children's

television exposure gathered at three weekly intervals.

Sample

The respondents for this study were 248 elementary school children, grades 1-6. Respondent's questionnaires were eliminated from the final analysis if they were not available to provide data at all three time intervals. This left a final sample of 204 respondents including 109 girls and 95 boys. There were between 30 and 40 students at each grade level in the final sample. Inspection of the demographic data indicates that the respondents were overwhelmingly of lower middle socioeconomic status.

Instrument

The children's television exposure was measured by their responses to a 24-show check list. Shows that very few people (or nearly all people) watch would have very low variance, and thus would be poor indicators of overall television viewing. Local Nielson ratings indicated that the portion of children watching any given show rarely exceeded 25 percent. Since shows with a viewing rate of 50 percent would provide the maximum variance, all shows chosen were popular among children according to local Nielson ratings. The shows included in the check list were all broadcast during periods of heavy viewing by children, i.e., 3 and 9 p.m. on weekdays, and 9 and 11 a.m. on Saturday. For the weekday programs, the most popular show was chosen from each time slot; however, the Saturday morning programs included four pairs of shows broadcast at the same time. While inclusion of less popular shows would allow for finer discriminations of viewing

levels, the reliance on popular shows should not bias the overall results of this analysis. The final check list included three daily afternoon shows, 13 prime time shows, and eight Saturday morning shows.

Administration

The instrument was administered to all respondents in their home classrooms. For the three afternoon shows, the children were asked to indicate if they had watched the show "yesterday" by circling a "yes" or a "no" on the questionnaire. For the 21 weekly shows, the children were asked to indicate if they had watched "in the last week" in the same manner. The researcher read the entire list aloud to the respondents taking care to see that all were able to keep pace. Research assistants were available to help any children who fell behind.

The Model

Joreskog's computer program, LISREL (Linear Structural Relations), is extremely flexible and allows for testing of a wide variety of models including path analytic and structural equations formulations. The application of interest in this paper is with use of the program for confirmatory factor analysis. As with any factor analysis, the basic assumption behind use of the procedure is that observed correlations among a set of variables can be accounted for by reference to a smaller set of unobserved variables (factors). In effect, the researcher assumes that observed correlations among variables are zero if those correlations are partialed on the factors upon which the variables load. The fundamental difference between confirmatory factor analysis and usual factor analysis is that the former assumes

that the research is able to specify a priori the number of factors and the causal relationships among the variables and factors included. Based on a priori assumptions, the researcher constrains factor loadings and factor correlations by imposing zero loadings, equal loadings, equal commonalities, some factors orthogonal to each other and some oblique. If enough constraints are imposed the model is identifiable and the solution is unique eliminating the necessity of rotation to minimize the communalities.

When the researcher does not have theoretic justification for imposing an adequate number of constraints on the model or does not have an adequate amount of observed information no unique solution exists (an infinite number of equally plausible solutions to the model may be derived). In this condition the model is called underidentified. When the researcher can impose exactly enough constraints in relation to his/her observed data, the model is just identified. When there are more than enough constraints and observed variables, the model is overidentified. In general, a model is overidentified when the number of observed variances and covariances exceeds the number of free parameters left defining relationships among variables after other parameters have been constrained. Overidentified models have an excess of information and several unique solutions could be derived for them. LISREL capitalized on this excess information to calculate a maximum likelihood solution which adjusts the parameter estimates to the best possible fit to the data.

A major advantage of LISREL is the chi-square goodness of fit test. After the maximum likelihood estimates of model parameters have been derived,

the estimates are used to regenerate "predicted" correlations among the observed variables. The predicted correlations are compared to observed correlation through a mathematical procedure that yields a value distributed as chi-square. (This is not the usual chi-square test used with categorical variables.) The degrees of freedom associated with this value equals the number of variances and covariances among the observed variables minus the number of parameters estimated in the model. A significant chi-square value indicates that the predicted correlations are different from the observed correlations and that the researcher has failed to construct a model that adequately represents the data.

In addition to the requirements that causal relationships among variables are properly specified and that enough restrictions are placed on the model for overidentification, use of LISREL for confirmatory factor analysis requires the following assumptions: (1) that all specified relationships among variables are linear and additive, (2) that a multivariate normal distribution obtains for relevant variables (measured and unmeasured) in the population, (3) that errors of measurement are random (uncorrelated with each other and with measured variables and factors), (4) large sample properties accrue to the data, and (5) all measures are at the interval level or better. These assumptions are reasonable for the data used here.

The substantive model tested here is shown in Figure 1. The probability that children will indicate that they have watched any specific program (or set of programs) is assumed to be a linear, additive function of three factors: (1) general level of television viewing for the time period

under consideration, (2) an enduring preference for the specific content of the program, and (3) random measurement error. While other factors such as popularity of competing programs are known to affect viewing, they are not considered in the model. Ignoring such factors amounts to a simplifying assumption to focus attention on more theoretically interesting variables.

The y's in the figure represent indexes of viewing of television shows of a specific content type during a specific week (derivation of these indexes, labeled Saturday, Action, and Family, is discussed below). The x's, labeled Week Factors 1, 2, and 3, represent general viewing levels for each of the successive weeks; the z's, labeled Saturday Factor, Action Factor, and Family Factor, represent enduring content preferences; the e's are random measurement errors, and the p's, errors of prediction.

The week and content factors can be considered a weighted sum of the indexes that comprise them. Because the analysis procedures used below standardizes both the observed indexes and the factors, all variables in the model reported have a mean of zero and a variance of one. The model could be solved for unstandardized variables so that all variables appeared in their "natural" units. In the unstandardized solution, the content indexes would have a range of zero to eight and the factors, each of which is a weighted sum of three indexes, would have a theoretic range of zero to 24. If appropriate algebraic manipulations were used to calculate estimates of the factor scores, their range would probably be slightly less than 24 because of errors of measurement. The standardized case is reported here for ease of presentation.

The paths (arrows) are indicative of causal influences; each content

index, y, has three paths leading to it--one from a Week Factor, one from a Content Factor, and one from its particular error term. Since the estimates calculated for these paths by LISREL may be interpreted as standardized partial regression weights, they are reliability coefficients. That is, in the standardized case, these path weights are the correlations of the observed scores with their assumed underlying true scores. The usual reliability index is the portion of variance in the true score accounted for by the observed score. Such indexes would be equal to the square of the path weights.

The paths between week factors are indicative of an assumption that general viewing levels are somewhat stable across time. Since the time order of the week factors is known, Week Two can be predicted from Week One and Week Three from Week Two. To simplify the model, a lag-one assumption is made; that is, Week One is assumed not to account for any variance in Week Three that is not accounted for by Week Two. The weights on the errors of prediction, p's, are simply indicative of the degree to which the week factors are not sequentially predictive.

The content factors are uncorrelated (have no paths between them) reflecting the substantive assumption that preference for one content is not causally related to preference for another. The content types are assumed to have no short term temporal order and knowledge of children's preference for one content type provides no information about their preference for another type. The assumptions are based on the reasoning that, in general, an individual's amount of television exposure is set by non-television constraints. The demands on the individual for work, personal

grooming, sleep, etc., leave a certain amount of time to allocate to recreation and a certain portion of recreation time is habitually devoted to television. After time allocation to television has been set, content preference dictates specific viewing patterns. Thus, television exposure is unrelated to content type. Some individuals may make fine discriminations among content types while other have little preference. Thus, content preferences are uncorrelated.

In terms of a traditional factor analysis, the model specifies that six underlying factors account for nine observed measures. The week factors are oblique, but the content factors are specified to be orthogonal to each other and to the week factors. Further, the model is constrained so that each observed measure has a non-zero loading on only two factors. The constraints of correlations among factors and of loadings of observed measures on factors are adequate to overidentify the model allowing for derivation of a unique solution and a goodness of fit test.

Statistical Analysis

The goal of the analysis is to estimate the path weights for the reliabilities, stabilities, errors of measurement, and errors of prediction. Unfortunately, LISREL limits the number of observed dependent measures to no more than 15. Thus, it was necessary to collape 72 variables, the 24 shows on the program check list for each of the three weeks, into indexes. Since nine indexes, three for each point in time, is the minimal number for overidentification of models of this type, it was decided that this number would be appropriate.

To aid in the construction of indexes, each respondent's "yes" responses for each show across the three points in time were summed yielding an index for each show ranging from 0 (never watched the show during the three week period) to 3 (watched the show every week). The correlations among these indexes are shown in Table 1. The correlation matrix was inspected to discern tentative viewing patterns. Because of the informality of the procedure, substantive issues could override anomalies judged to derive from extraneous considerations. For example, the relatively high correlation, .51, between viewing of Hawaii Five-O and Little House on the Prairie could be attributed to the fact that they were broadcast on the same network and evening rather than as evidence that they have content characteristics in common.

The content indexes decided upon were: (1) Saturday Indexes including all Saturday morning shows, (2) Masculine/Action Indexes including shows that stress male roles and adventure, and (3) Femine/ Family Indexes including shows that stress female roles and interpersonal problems. The indexes are relatively arbitrary and function primarily to demonstrate the procedures used in this paper. However, the composition of the indexes reflect patterns in the set of correlations shown in Table 1. Further, it is very likely that they are related to demographics with Saturday shows being negatively related to age, the action shows appealing to boys, and family shows appealing to girls. The shows included in each index can be seen in Table 1.

The nine content indexes (one for each content type at each point in time) were computed and their intercorrelation matrix (Table 2) was sub-

mitted to LISREL to test the model. There are 45 observed variances and covariances in the data and, conceptually 31 parameters to be estimated--the path of each of the nine content indexes on a week factor, a content factor, and error, (27 parameters), two stability parameters, and two errors of prediction. Six paths of indexes on factors were set to one providing a metric in the unstandardized solution but not affecting the standardized solution which is of interest. This procedure reduced the number of parameters to be estimated, to 25, leaving 20 degrees of freedom for the goodness of fit test. It should be noted that the program automatically sets errors of prediction for Week Factor One and all content factors to one.

Results and Discussion

The goodness of fit test of the model yielded a chi-square value of 27.316, which with 20 degrees of freedom has a probability level greater than .10. This represents a failure to reject the null hypothesis that the observed correlation matrix and the predicted correlation matrix are not significantly different.

The predicted correlations among the nine content indexes are shown in Table 2B. Comparison of the predicted correlations to the observed correlations reveals that the model generally is a plausible representation of the data. These correlations differ by no more than .09 and on the average differ by an absolute value of .03.

The six hypothesized factors account for a total of 74 percent of the observed variance in the content indexes. This is not a particularly impressive figure by the standards of traditional factor analytic procedures, which would account for all variance with eight factors. The

strength of confirmatory factor analysis lies in the a priori interpretation of the result. That is, give a fit of the model to the data, the researcher confirms his assumptions and is not faced with the problem of exploring and interpreting a complex factor structure derived from arbitrary mathematical criteria.

The fit of the model and the variance accounted for are impressive in light of the simplifying assumptions made. The data can be accounted for by reference to simple assumptions about viewing level and content preference without regard to other factors that are known to operate. It should be stressed that such factors are disregarded and not statistically controlled or eliminated in any way. For example, some of the variance in the Saturday Factor may well be accounted for by the shows proximity in the schedule rather than by content preference.

The parameter estimates are shown in Figure 1. For ease of presentation the factor loadings of the content indexes on the factors are repeated in Table 3.

The analysis supports the following conclusions: (1) the eight-item indexes are modestly reliable indicators of both overall television exposure and content preference, (2) television exposure is a moderately stable phenomenon over the relatively short period of one week, and (3) discerible content preferences can be isolated within the context of overall viewing.

The reliabilities of the indexes are modest at best. The usual definition of reliability is the portion of variance in common between the observed score and the true score. Therefore, the loadings of the

indexes on the factors must be squared to derive the standard reliability index. Thus, the reliabilities range from a high of .627 for Saturday Index One as an indicator of Week Factor One to a low of .098 for Family Index Three as an indicator of the Family Factor.

The average reliability for the Week Factors is .499 and for Content Factors, .216 indicating considerably more difficulty in assessing content preferences than in assessing general viewing levels.

The stabilities are also moderate, .723 between Week Factor One and Week Factor Two, .831 between Week Factor Two and Week Factor Three, and .600 between Week Factor One and Week Factor Three (the latter stability coefficient is the product of the other two under the assumptions of the model). These stabilities should serve as a cautionary note for researchers attempting to assess long range impact of television with cross-sectional data. With the procedures used here no single week is a good indicator of viewing across the three weeks. Of course, researchers could ask about "usual" viewing patterns rather than specific patterns for the preceding week. Usual patterns would probably be a better indicator of long-term exposure.

Because of the arbitrary construction of the content indexes interpretation of the content factors is problematic. Had the shows been grouped together by an explicit external criterion, for example, level of violence portrayed, their loadings together would be more directly attributable to that criterion. Of course, there is no assurance that any particular criterion is related to viewing patterns, and therefore that such a criterion would not reveal content perference patterns. It is almost

certain that the current data could have been used to construct indexes that would minimize loadings on the content factors. On the other hand, content indexes probably could have been constructed that yielded higher loadings on content factors.

The use of a single method for assessing television exposure, the program check list, could have biasing effects on the parameter estimates. If the respondents had consistent response proclivities such as a "yes" bias overestimating exposure or a reluctance to admit heavy exposure, these proclivities would inflate parameter estimates. Such problems reflect a violation of the assumption that errors of measurement are random. Such problems could be overcome by using maximally different method of assessing viewing levels as suggested by Campbell and Fisk (1959). For example, the researcher might set up a model similar to the one shown here using three distinct measurement methods, e.g., a show check list, children's estimates of viewing time, and parent's estimates of viewing time. The current model's content factors could be replaced by methods factors the weights of which could be interpreted as the bias due to methods. With such a model, the research could choose the most reliable and/or least biased measurement method for subsequent research. The model presented in this paper uses a single method; therefore no recommendation can be made concerning the relative efficacy of differing measurement techniques.

The possibility of constructing models like the one presented here has several ramifications for further research. The existence of techniques without requiring overly restrictive assumptions is quite useful in itself.

As shown above, the procedure allows for explicit comparison of the reliabilities and biases of differing measurement procedures. Estimation of the stability of television exposure has important implications for researchers attempting to assess the impact of television on social attitudes and behaviors since it is generally assumed that such impact depends on long-term exposure.

Perhaps the most important ramification of confirmatory factor analysis is that it allows for isolation of uncorrelated content preference factors. Such factors could be of particular interest both as dependent and independent variables in further research. As dependent variables the content factos isolated here may well be related to demographics. For example, boys may seek male models and adventure as assessed in the Action Factor while girls seek female models and interpersonal stimulation as assessed by the Family Factor. As Independent variables, the factors may well predict learning of pro- and antisocial behaviors or acceptance of sex role stereotypes. Because the content factors are uncorrelated, they can be used as predictors without problems of multicolinearity. Since the procedure yields "pure" content factors, tests of such propositions would be relatively straightforeward.

Further research on children and television using this technique should proceed with indexes of shows based on explicit criteria and substantive propositions to test. It should be noted that models of content preference could be devised for cross-sectional data. Use of confirmatory factor analysis may well be of considerable benefit to researchers attempting to examine the role of television in the development of children.

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Table 1. Correlations of Show Viewing Summed Across Three Times

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Saturday Index														
1. Scooby Doo	---													
2. Land of the Lost	.19	---												
3. The Flintstones	.53	.27	---											
4. Sigmund and the Sea Monsters	.31	.47	.32	---										
5. Pink Panther	.32	.39	.38	.57	---									
6. Valley of the Dinosauars	.41	.42	.29	.28	.20	---								
7. Superfriends	.50	.32	.38	.41	.36	.34	---							
8. Harlem Globetrotters	.21	.32	.25	.26	.36	.31	.22	---						
Action Index														
9. Gunsmoke	.15	.24	.14	.15	.15	.31	.22	.27	---					
10. Adam-12	.32	.38	.30	.34	.39	.29	.23	.20	.08	---				
11. Mash	.11	.10	.12	.01	.11	.18	.11	.30	.17	.17	---			
12. Hawaii 5-0	.26	.34	.20	.41	.31	.22	.25	.28	.29	.33	.27	---		
13. Streets of San Francisco	.11	.25	.06	.26	.21	.26	.29	.12	.15	.21	.18	.23	---	
14. Sanford and Son	.16	.24	.19	.29	.37	.21	.09	.29	.19	.27	.26	.36	.13	---
15. Chico and The Man	.05	.16	.11	.16	.34	.17	.01	.31	.12	.24	.35	.25	.08	.70
16. Rockford Files	.13	.15	.16	.12	.18	.15	.08	.25	.01	.29	.36	.31	.12	.33
Family Index														
17. Gilligan's Island	.18	.14	.28	.30	.29	.27	.24	.23	.04	.31	.21	.31	.14	.16
18. Beverly Hillbillies	.20	.20	.26	.23	.22	.31	.25	.17	.16	.20	.08	.21	.15	.21
19. Partridge Family	.15	.12	.22	.16	.16	.19	.11	.17	.18	.10	.21	.21	.03	.18
20. Bewitched	.34	.36	.39	.38	.32	.31	.40	.26	.15	.27	.08	.25	.09	.15
21. Maude	.25	.19	.22	.15	.25	.26	.21	.33	.30	.13	.42	.36	.30	.28
22. Little House on the Prairie	.17	.30	.22	.33	.27	.23	.25	.16	.21	.30	.16	.54	.15	.20
23. Lucas Tanner	.07	.08	.10	.15	.17	.19	.11	.30	.12	.10	.25	.30	.36	.14
24. Waltons	.28	.32	.40	.15	.20	.29	.25	.29	.33	.24	.14	.23	.00	.15

Table 1 (cont'd.)

	15	16	17	18	19	20	21	22	23	24
Action Index										
15. Chico and The Man	---									
16. Rockford Files	.39	---								
Family Index										
17. Gilligan's Island	.20	.01	---							
18. Beverly Hillbillies	.10	.10	.32	---						
19. Partridge Family	.19	.10	.33	.20	---					
20. Bewitched	.12	.06	.36	.36	.32	---				
21. Maude	.19	.08	.20	.28	.13	.23	---			
22. Little House on the Prairie	.15	.17	.21	.17	.13	.22	.04	---		
23. Lucas Tanner	.22	.21	.29	.17	.10	.15	.24	.21	---	
24. Waltons	.08	.06	.20	.23	.31	.33	.21	.24	.11	---

Table 2. Observed Correlations of Nine Content Indexes

	Y_{11}	Y_{12}	Y_{13}	Y_{21}	Y_{22}	Y_{23}	Y_{31}	Y_{32}	Y_{33}
Saturday 1 (Y_{11})	1.00								
Action 1 (Y_{12})	.34	1.00							
Family 1 (Y_{13})	.46	.33	1.00						
Saturday 2 (Y_{21})	.60	.17	.35	1.00					
Action 2 (Y_{22})	.46	.51	.33	.55	1.00				
Family 2 (Y_{23})	.36	.20	.49	.55	.52	1.00			
Saturday 3 (Y_{31})	.63	.12	.30	.76	.45	.45	1.00		
Action 3 (Y_{32})	.39	.41	.27	.41	.57	.49	.56	1.00	
Family 3 (Y_{33})	.46	.12	.42	.51	.44	.65	.61	.56	1.00

Table 2B. Predicted Correlations of Nine Content Indexes.

Saturday 1(Y_{11})	.99	---						
Action 1 (Y_{12})	.36	1.00	---					
Family 1 (Y_{13})	.47	.27	1.00	---				
Saturday 2(Y_{21})	.58	.24	.32	.99	---			
Action 2 (Y_{22})	.43	.55	.33	.57	1.04	---		
Family 2 (Y_{23})	.41	.23	.51	.54	.54	.99	---	
Saturday 3(Y_{31})	.58	.21	.27	.76	.48	.45	.98	---
Action 3 (Y_{32})	.37	.49	.28	.48	.63	.46	.59	1.05
Family 3 (Y_{33})	.37	.21	.40	.48	.48	.62	.59	.60

Table 3. Loadings of Content Indexes on Factors

	Weeks			Content			
	X_1	X_2	X_3	Z_1	Z_2	Z_3	Communality
Saturday 1 (Y_{11})	.792	.00	.00	.348	.00	.00	.753
Action 1 (Y_{12})	.449	.00	.00	.00	.780	.00	.801
Family 1 (Y_{13})	.596	.00	.00	.00	.00	.384	.494
Saturday 2 (Y_{21})	.00	.748	.00	.445	.00	.00	.771
Action 2 (Y_{22})	.00	.757	.00	.00	.395	.00	.691
Family 2 (Y_{23})	.00	.714	.00	.00	.00	.534	.801
Saturday 3 (Y_{31})	.00	.00	.760	.639	.00	.00	1.00
Action 3 (Y_{32})	.00	.00	.775	.00	.354	.00	.664
Family 3 (Y_{33})	.00	.00	.769	.00	.00	.314	.696
Variance Accounted for	.130	.180	.196	.080	.098	.055	Total .740

X_1 Week Factor One

X_2 Week Factor Two

X_3 Week Factor Three

Z_1 Saturday Factor

Z_2 Action Factor

Z_3 Family Factor

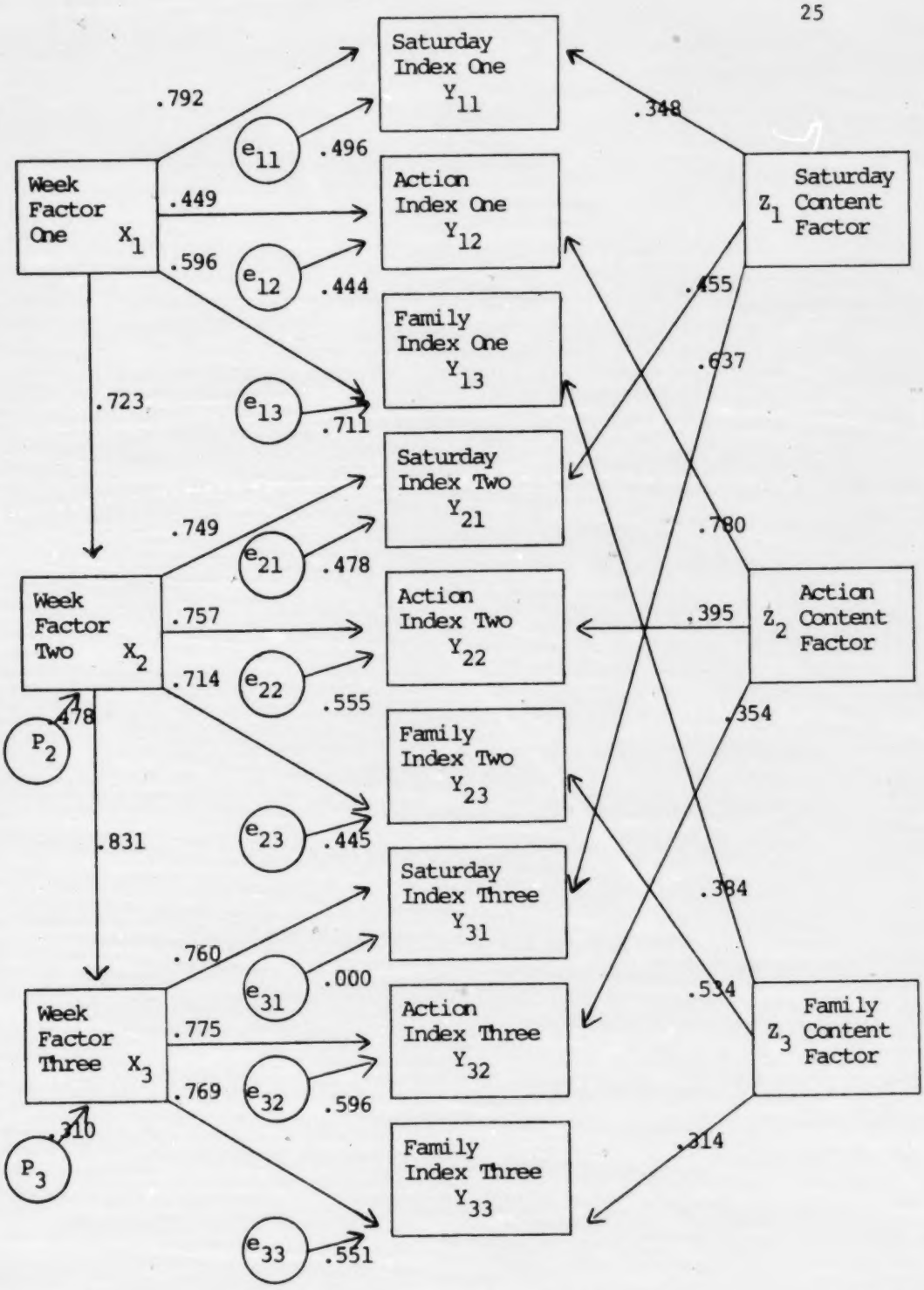

Figure 1. Path Diagram Representing a Model of Television Exposure